REMARKS

These amendments and remarks are being filed in response to the Office Action dated November 23, 2004. For the following reasons, this application should be allowed and the application passed to issue.

No new matter is introduced by this amendment. The amendment is supported by the specification at page 5, lines 18-24; page 6, lines 14-22, and page 15, lines 6-7. Applicants submit that in view of this amendment, remarks, and the supporting Declaration under 37 C.F.R. § 1.132 filed in the previous response, that this application is condition for allowance.

Claims 5-12, 14, and 16 are pending in this application. Claims 5-12 have been withdrawn. Claims 14-19 have been rejected. Claims 14 and 16 have been amended in this paper. Claims 1-4 and 13 were previously cancelled, and claims 15 and 17-19 have been cancelled in this response.

Rejections Under 35 U.S.C. § 112

Claims 14-19 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because it is allegedly not clear whether the atomic % recited in the claim is based on only the hard or soft magnetic phase or the entire mother material. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Claim 14 has been amended to specify that the atomic % is based on the crystalline mother material. Applicants submit that the claims fully comport with the requirements of 35 U.S.C. § 112.

Claim Rejections Under 35 U.S.C. §§ 102 And 103

Claims 14-19 are rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Nomura et al. (U.S. Patent No. 6,261,385).

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention as claimed and the cited prior art.

An aspect of the invention, per claim 14, is an anisotropic exchange spring magnet powder made by a process comprising the steps of preparing a crystalline mother material containing a hard magnetic material phase including neodymium (Nd), iron (Fe), and boron (B). The mother material further contains a soft magnetic material phase including iron (Fe) and boron (B). The content of the neodymium (Nd) is from 2 to 15 atomic % of the crystalline mother material, and the content of the boron (B) is from 1 to 25 atomic % of the crystalline mother material. The crystalline mother material has a content of amorphous parts of about 30%. The crystalline mother material is amorphised. The crystalline mother material amorphisated in the amorphising process is crystallized. The amorphising process is conducted under an atmosphere of argon and the crystallizing process is conducted by heat treating at about 600 °C for about 10 minutes under vacuum.

The Examiner asserted that Nomura teaches an anisotropic rare earth magnet consisting of a hard magnetic phase and a soft magnetic phase containing a rare earth metal, a transition metal, and nitrogen or boron. The Examiner alleged that Nomura defines the crystal size of the nanocomposite as being "several tens of nanometers." The Examiner acknowledged that Nomura does not disclose the process steps recited in the claims. Characterizing the claims as product-by-process claims, the Examiner maintained that the prior art product appears to be identical or only slightly different from the claimed product, and therefore a rejection under 35 U.S.C. §§ 102 and 103 was acceptable.

In the "Response to Arguments" section of the Office Action, the Examiner argued that the declaration is insufficient to overcome the rejection of claims 14 to 19 based upon Nomura because:

I. There is only one example of the claimed invention in the present data. . . . the data is not considered to be commensurate in scope to the claims.

II. Each of the Figures attached to the declaration is so dark [in particular the lower right hand corner of Figure 2] that it is difficult to impossible to determine what it is that these Figures show.

III. Nomura employed a wheel speed of 45 m/sec [Example 3] while applicants used a wheel speed of 24 m/sec. It is not clear how this change in wheel speed from that used by Nomura might effect the properties of the finished alloy.

Further, the Examiner argued that:

> Nomura's alloy is disclosed as a nanocomposite and Nomura defines the crystal size of a nanocomposite as being "several tens of nanometers" (column 2, lines 40 to 45) which overlaps the instantly disclosed grain size of "150 nm or less" of applicant's alloy.

In response to the Examiner's arguments: (I) claim 14 is amended to be commensurate in scope with the example in the Shimada declaration. (II) Lighter Figures 1 and 2 are provided with higher contrast. It is clear that these figures show the difference between the crystal size of the magnet powder obtained by Nomura and that obtained by the claimed invention.

Regarding the Examiner's argument (III), Dr. Shimada determined that there is no significant difference between the experimental result under the wheel speed of 45 m/sec and that under the wheel speed of 24 m/sec because the experiment with the wheel speed of 24 m/sec obtained the quenched thin ribbons having a 100 % amorphous structure. Thus, even if a higher rolling velocity was selected, the quenched thin ribbons would have a 100 % amorphous structure. If a higher rolling velocity, such as 45 m/sec was selected the result would be the same, a magnet powder having a crystal particles with a diameter of about 150 nm.

As regards the Examiner's argument concerning the crystal grain size, Nomura merely refers to theoretical possibilities for producing a magnet power having a crystal size on the order of several tens of nanometers in column 2 lines 40 to 45. Here it should be noted that Nomura's magnet powder has the crystal size of about 150 nm, as shown in Figure 1. Nomura does not actually disclose that the crystal size of the magnetic powder obtained by Examples 1 to 16 is several tens of nanometers.

Applicants submit that Nomura does not disclose or suggest a magnet powder made by a process having **crystal sizes on the order of several tens of nanometers**.

As is clear from the comparison of Figure 1 with Figure 2, the crystal size of the magnet powder obtained by the claimed invention is smaller than that obtained by the Nomura's Example 3. This means that the magnet powder of the claimed invention has a larger coercive force than that of Nomura because coercive force is a decreasing function of the crystal size of a magnet powder. In general, the coercive force is one of important indexes indicating the physical qualities of magnet powder. The **smaller** the crystal size of the magnet powder the **stronger** the coercive force. Dr. Shimada estimates that the coercive force of the magnet powder obtained by the claimed invention is about 320 kA/m (4 kOe) whereas that of the magnet obtained by the Nomura's Example 3 is about 80 kA/m (1kOe). The strength of the coercive force of magnets obtained from the present invention is about 4 times of that of Nomura. Magnet powder obtained by the claimed invention is higher quality than that obtained by Nomura. The difference in the strength of coercive force is caused by the difference of step 5 of Nomura and steps 5 and 6 of the instant invention (as described in the Shimada declaration). In particular, the difference of temperature (900 °C) of step 5 of the Nomura and step 6 (600 °C) of the instant invention is essential for the difference in the strength of coercive force.

Because magnet powder produced according to the present invention is clearly different from the Nomura magnet powder and the difference is unobvious, Applicants submit that the rejection of the instant claims under 35 U.S.C. §§ 102 and 103 as a product-by-process rejection is overcome by the showing in the declaration.

The quenched ribbon produced by the Nomura process is 100% amorphous, while the crystalline mother material of claim 14 has an amorphous content of 30%. Consequently, a compressing process is required to obtain the nanocomposite magnet powder from the Nomura powder, while the mother material of claim 14 is amorphised and crystallized. The amorphising process amorphises crystals remaining in the pulverized powder generating very fine crystals distributed throughout the powder. The very fine crystals grow continuously during the crystallizing step. As a result, an anisotropic exchange spring magnet powder that has crystal particles with diameters of about 50 nm is obtained.

The present invention does not include the compression step required by Nomura. Anisotropic exchange spring magnet powder is obtained from the Nomura process by compressing the powder. The present invention obtains exchange spring magnet powder by amorphising and crystallizing processes. Thus, the anisotropic magnet powder of the present invention is obtained by the principle of crystal growth.

In light of the above Remarks, this application should be allowed, and the case passed to issue. If there are any questions regarding these remarks or the application in general, a telephone call to the undersigned would be appreciated to expedite prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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